

Please amend the claims as indicated below:

1-24 (Cancelled)

25. (Withdrawn)



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AI (112 2nd obj) 26. (New) An apparatus of positioning solder balls in a desired array on a substrate, comprising:
a guide member which is constructed and configured to direct the solder balls to positions corresponding to the array of positions the solder balls are to take up on the substrate;
a container for a plurality of solder balls, the container being movable between a first position remote from the guide member and a second position directly in communication with the guide member; and
a mechanism constructed and configured to apply a force to the solder balls in the container in the direction of movement of the container as the container moves between the first position to the second position.

27. (New) An apparatus according to claim 26, wherein the biasing means comprises tilting means adapted to rotate the container about an axis perpendicular to the direction of motion of the container and thereby tilt it.

28. (New) An apparatus according to claim 27, wherein the container and positioning means are rotatable a plurality of times when the container is in position directly over the positioning means, so that the solder balls are repeatedly spread over the positioning means.

29. (New) An apparatus according to claim 27, wherein rotational angles of the container and/or the moving speed of the container are controllable to optimize the efficiency of the apparatus.

30. (New) An apparatus according to claim 28, wherein there is a guide rail and motor whereby the motion of the container is guided and driven.

31. (New) An apparatus according to claim 26; which includes a vibration-generating device to facilitate the separation of solder balls from surfaces they are in contact with and/or from one another.

AI 32. (New) An apparatus according to claim 26, wherein the positioning means includes a ball template with a plurality of apertures each slightly larger than the size of a solder ball in order to capture solder balls within the ball template, and wherein the plurality of apertures are arranged in an order similar to the array of positions comprising solder pads on the substrate.

33. (New) An apparatus according to claim 31, wherein solder balls captured in the plurality of apertures are removable by a pick-and-place device while retaining their respective positions, and placed onto corresponding positions of solder pads on the substrate.

34. (New) An apparatus according to claim 31, which includes means to rotate the container, ball template and substrate simultaneously.

35. (New) An apparatus according to claim 31, wherein the apertures comprise through-holes which allow solder balls to fall through the ball template directly onto a substrate placed below it.

36. (New) An apparatus according to claim 31, wherein there is a separator capable of separating the ball template from the substrate in use, and the separator is movable from a first position where passage of solder balls from the ball template onto the substrate is prevented and a second position where passage of the solder balls from the ball template onto the substrate is permitted.

37. (New) An apparatus according to claim 26, wherein the container is closed at the top to reduce oxidation of the solder balls and open at the bottom for direct entry of the balls to the positioning means.

38. (New) A method of positioning solder balls in a desired array on a substrate, comprising the steps of:

providing a plurality of solder balls in a container;

configuring a guide member to position solder balls in a desired array corresponding to the positions the solder balls are to take up on the substrate;

moving the container between a first position remote from the guide member and a second position where it is in communication with the guide member;

AI applying a force to the solder balls in the container in the direction of movement of the container as the container moves between the first position to the second position thereby to reduce or obviate damage to the solder balls during such movement; and

positioning solder balls from the container in the desired array using the guide member when the container is at the second position.

39. (New) A method according to claim 38, wherein the biasing of the solder balls caused by the tilting of the container towards the direction of movement of the container is such that the weight of the solder balls creates a biasing force in the said direction.

40. (New) A method according to claim 39, wherein the angle of tilting the container and the speed of displacement of the container are controllable in order to optimize the efficiency of positioning the solder balls.

41. (New) A method according to claim 38, which includes the step of moving the container from the second position to the first position while at the same time providing means to bias the solder balls to move in the direction of movement of the container.

42. (New) A method according to claim 41, which includes the step of moving the container to the location over the positioning means a plurality of times in order to increase the number of solder balls captured by the positioning means.

43. (New) A method according to claim 39, which includes rotating the container a plurality of times whilst the container is located over the positioning means so that the solder balls are repeatedly spread over the position means.

44. (New) A method according to claim 38, which includes the step of vibrating the container during movement of the container and/or while the container is located over the positioning means.

A/ 45. (New) A method according to claim 38, wherein the positioning means includes a ball template with a plurality of apertures each slightly larger than the size of a solder ball, which plurality of apertures capture solder balls within the ball template, and wherein the plurality of apertures are arranged in an order similar to the array of positions comprising solder pads on the substrate.

46. (New) A method according to claim 45, wherein solder balls captured in the plurality of apertures are removed by a pick-and-place device while retaining their respective positions, and placed onto corresponding positions of solder pads on the substrate.

47. (New) A method according to claim 45, wherein the container, ball template and substrate are rotated simultaneously.

48. (New) A method according to claim 45, wherein the apertures comprise through holes which allow solder balls to fall through the ball template directly onto a substrate placed below it.

49. (New) An apparatus according to claim 45, wherein in use a separator separates the ball template from the substrate, and the separator is movable from a first position where passage of solder balls from the ball template onto the substrate is prevented and a second position where passage of the solder balls from the ball template onto the substrate is permitted.
